Progress of Development of Eurocodes in Malaysia

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CURRENTLY, IEM is actively involved in the development of the Malaysian National Annexes for various Eurocodes. In general, the National Annex is required to address the following issues:

i) Malaysia's decision on nationally Determined Parameters – Eurocodes allows some parameters to be determined independently by each member country to suit the local conditions;

ii) Malaysia's decision on the informative annexes – Some informative annexes may be applicable or not applicable to local conditions.

iii) Reference to Non-Contradictory Complementary Information (NCCI).

The following documents have been completed, up for public comment and pending publication:

i) National Annex to MS EN 1990 Basis of Structure Design;

ii) National Annex to MS 1991 – 1 – 1 Actions on Structures, Part 1 – 1: General Actions – Densities, Self weight, imposed loads for buildings;

iii) National Annex to MS 1992 – 1 – 1, Design of Concrete Structures – Part 1 – 1: General Rules and Rules for Buildings.

The public comment for EN 1993 – 1 – 1 is from 1 December 2009 to 31 March 2010. We would like to urge our fellow engineers to be actively involved in this public comment as this will definitely affect our future. Please refer to *http://www.sirim.my/std_dev/h4_01.htm* for further details. Public comment can be sent to Sirim Berhad or IEM's Civil and Structural Engineering Technical Division (CSTD) by email to *pamela@iem.org.my*.

Various road shows have been planned and carried out. Road shows for EC 0, 1 and 2 have been completed. A total of three road shows have been organised in Kuala Lumpur, Selangor, Penang and Johor. The next road show will be organised in Miri. The road show for EC 3 will be in February.

Technical committees have been set up for EC 7 (by the Geotechnical Engineering Technical Division) and EC 8 (the CSTD). Another Technical Committee has been set up for wind load (to update MS 1553: 2002 and to consider incorporating and harmonising with EN 1991 – 1 – 8). ■

Simplified Design Standards for Reinforced Concrete Structures

by ***Ir. Assoc. Prof. Dr Jeffrey Chiang Choong Luin***

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THERE are two main international design standards that are widely accepted or adopted for concrete structures. These standards are ACI 318 by the American Concrete Institute, and EN 1992 (EC2) by the European Standards Committee. Both organisations are jockeying or competing for their standards to be accepted or adopted outside their geographic regions, *i.e.* the North American region and the European Union. Their main target is Asia – in which many fledging national standards institutions are assessing or considering either of these as their adopted national standards, or as basis to develop their own national standards.

The above scenario is further complicated by having other international standards also vying to be accepted or adopted on a national or regional basis. These include the Australian Standards AS3600, the Asian Concrete Model Code ACMC2006, and recently, the African Concrete Model Code.

Adding to the complexity, the International Standards Organisation (ISO) also has its own standards, *i.e.* ISO19338 – which is actually not a standard per se, but a standard assessor of national or regional concrete codes, which may comply with ISO requirements. ISO19338 actually recognises ACI318, Eurocode EC2, AS3600, the Architectural Institute of Japan Standards (AIJ), the Colombian National Code, and the Saudi Building Code as deem-to-satisfy ISO standards. Recently, it also approved the Egyptian Concrete Code in these stable of ISO-recognised standards.

The ISO body that takes charge of standards development for concrete structures is the ISO/TC 71, and the tradition is that those national institutes which hope to get their national codes to be accepted as ISO-compliant would usually bid to be the host of the next round of plenary meeting of ISO/TC 71. The last round of meeting was held in Cairo, Egypt, in February 2009.

Now, getting back to the topic at hand – when drafters of national or international standards wish to produce simplified design procedures, the first question that should come to mind is: should the drafters develop standard procedures which are simple enough so that they can be readily understood and implemented, or should they come up with a standard that caters for simple, straightforward and lowrise structures which are sufficiently stable and safe – especially in underdeveloped or developing countries or economies?

The ISO standard usually has such recommendations, as it tries to incorporate design features and procedures which can be readily adopted and applied in underdeveloped countries which suffer frequent failures or collapse of houses, buildings and homes due to natural disasters like floods, tornadoes, earthquakes, tsunamis, *etc*. Interestingly, the Malaysian Standards for Wind Loads MS1553:2002 has a separate section which caters for a simplified design procedure for wind load design, for designers who wish to ensure that their structure complies with the basic requirement for wind resistance, subject to certain conditions of the structural configuration.

Through this means, the designers may not have to follow the full requirements stated in the main document. This arises because the technical committee which drafted MS1553 had also referred to ISO standards, and believed that by incorporating the simplified procedure, it will ensure effective implementation of "simple" structures. Two different cases that illustrate inclusion of simplified designs are presented.

In the ISO/TC 71, there is a Subcommittee 5 on *"Simplified Design Standards for Concrete Structures"*, which in 2005, produced a document ISO 15673 titled Guidelines for the Simplified Design of Reinforced Concrete Structures. It is considered a state-of-the-art design document catering for developing countries which have multiple housing problems including those caused by natural disasters. Not surprisingly, Sub-committee 5 of ISO/TC 71 is led by Dr Josef Farbiarz, a noted expert from the Colombian National Standards Institute, who is strongly supportive of housing development and safety for poor countries and economies worldwide.

The basic criteria for the application of ISO15673 are as follows:

- Applicable to lowrise buildings with little asymmetry
- Inapplicable to complex or important structures such as theatres, stadiums, coliseums, hospitals, and other critical structures with high occupancy

The second example is closer to home. In drafting the Malaysian National Annex for Eurocode EC2 – which had been completed recently and published as a draft document released for public comments – the technical committee concerned also considered the need to cater for existing practice in the local construction industry, as elaborated in the following.

In typical lowrise reinforced concrete building structures in Malaysia, *e.g.* two-storey houses or shop lots, it is common practice to design and construct thin structural elements for the beams and columns (125mm in depth and/or width) so as to ensure a flushed look with the built up brick walls for enclosure or party wall separation. This has been practiced for decades in the local construction industry. Unfortunately, this type of design and construction is not catered for in Eurocode EC2, which advocates a minimum size ranging from 150mm to 200mm for structural elements.

Hence, the technical committee formed a working group to draft the necessary design guidelines to cater for this type of "simplified" structures with thin elements. It will not be written into the National Annex of EC2, but will be published as a separate Non-Contradictory Complementary Information document (NCCI). Local experts have been sought to provide inputs into the development of the guidelines as stipulated. The recommended sizes of such thin elements will also be clearly stated, with the necessary justifications to explain its compliance as well as implementation.

In conclusion, in prescribing simplified design standards for structures which are deemed to be simple, the key is to ensure that the design steps outlined are not too cumbersome, and can be readily understood by local practitioners. ■